

REMARKS

This paper is responsive to the Office Action mailed January 23, 2008. Claims 1-31 and 37-39 are currently pending in the above-identified application. No amendments to the claims are offered. Reconsideration of the claims in view of the following remarks is respectfully requested.

Applicants gratefully acknowledge the telephone discussion between Applicants' representative and Examiner Werner on April 17, 2008, where certain differences between the claimed invention and cited references were discussed. No specific agreement was reached.

Drawings

The Office Action objected to Figure 12 as being an illegible. In response, a more legible version of Figure 12 has been provided. Accordingly, Applicants respectfully request that this objection be removed.

Rejections Under 35 U.S.C. §103

The Office Action rejected claims 1-31 and 37-39 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,409,504 to Jones *et al.* (hereinafter "Jones") in view of U.S. Patent No. 6,648,640 to Rubbert *et al.* (hereinafter "Rubbert"). Applicants respectfully traverse.

Applicants respectfully submit that the Office Action has failed to establish the required *prima facie* case of obviousness for numerous reasons. First, as will be discussed in more detail below, the claimed subject matter in the present application is entitled to a priority date that pre-dates Rubbert's filing date. Second, regardless of whether Rubbert is disqualified as prior art under 35 U.S.C. §102, the proposed combination of Jones and Rubbert simply fails to teach or suggest all elements of the claimed invention as recited in each of the presently rejected claims.

Claim 1 recites a "computer-implemented method for separating gingiva from a tooth on a computer model of the gingiva and the tooth, the method comprising: defining a closed cutting surface passing through a line between the gingiva and a crown of the tooth, wherein the closed cutting surface comprises a crown portion surrounding the crown of the tooth and a root portion approximating the shape of the root of the tooth, and wherein the crown portion of the closed cutting surface comprises a volume greater than the volume of the crown of the tooth; and applying the cutting surface to the tooth to separate the gingiva from the tooth."

Jones (commonly assigned compared with the present application) teaches computer automated techniques for subdividing, or segmenting, a digital dentition model, e.g., using 2D slices, into models of individual dentition components. While representing a considerable advancement in the art, Jones fails to teach or suggest each element recited by claim 1, including, for example, defining a closed cutting surface that comprises a crown portion surrounding the crown of the tooth in addition to a root portion approximating the shape of the root of the tooth, with the crown portion of the closed cutting surface having a volume greater than the crown of the tooth, as recited in claim 1 (as recognized by the Office Action - see page 3 of 1/23/2008 Office Action).

With regard to the newly cited Rubbert, Applicants initially point out that the claimed subject matter in the present application is entitled to a priority date (August 16, 2000) that pre-dates the Rubbert 09/835,039 Application filing date (April 13, 2001), thereby disqualifying Rubbert '039 Application as prior art under 35 U.S.C. §102. The present application claims priority to U.S. Application No. 09/640,328 (now U.S. Pat. No. 6,386,878) filed August 16, 2000. Support for the claimed subject matter can be found in application No. 09/640,328, e.g., at least at Figs. 8B, 11, and 12. While the Rubbert '039 Application claims priority to various applications, none of these Rubbert priority applications have been cited by the Examiner in the present action. Applicants respectfully point out that it is the responsibility of the Office, not the Applicant, to bear the initial burden of establishing *prima facie* obviousness (e.g., MPEP §§2142, 2143). In the present instance, the Office has failed to factually support the allegation that each and every element of the presently claimed invention is found in the prior art. As such, the present rejections should be withdrawn at least for this reason or, if not

withdrawn, factually supported with specific reference to Rubbert priority documents that predate the priority of the present application.

Regardless of whether Rubbert qualifies as prior art to the present application, and in order to be fully responsive to the Office action, Applicants point out that Rubbert simply fails to teach or suggest elements missing from Jones. While the teachings of Rubbert might be considered similar to the currently claimed methods in the general sense that both Rubbert and the present invention involve segmentation of dentition components (see Office Action on pages 3-4, for citations to col. 50, lines 10-14; FIG. 58B; and col. 50, lines 35-52), Rubbert, including at the provisions cited by the Examiner, teaches methods fundamentally different than the presently claimed method recited in claim 1. Rather than cutting and separating components of dentition in a computer model of a patient's teeth as recited in claim 1, Rubbert teaches techniques more akin to selective image reconstruction, using a generic virtual tooth template overlaid on a scan of a patient's tooth. In contrast to the method of claim 1, which uses the recited cutting surface to separate the gingiva from the tooth, Rubbert teaches constructing a tooth model from selected surfaces of the scanned tooth, with remaining parts of the tooth model generated from the template tooth data (see col. 51, lines 1-2). Thus, rather than using the template tooth as a "cutting surface" as indicated in the Office Action on page 3, Rubbert instead teaches overlaying scanned tooth and template tooth data for selection of surfaces using vectors drawn from points on the template tooth to the scanned point cloud of the tooth (see col. 50, lines 53-57), and then essentially selectively reconstructing an image of a tooth using selected data from the scan and template. No actual "cutting" as recited in the current claims is taught in Rubbert, and Rubberts use of template tooth data would not provide the closed cutting surface as recited in claim 1.

Additionally, not only is the basic methodology of Rubbert fundamentally distinct compared to the claimed invention, but the very different technique of Rubbert would not provide the advantage of precisely separating different dentition components (e.g., gingival and tooth) on a computer model of the patient's dentition as provided by the currently claimed invention. Rather than teaching precise separation, the goal of Rubbert is indicated to be more of a rough approximation. Attention is respectfully drawn to Rubbert at col. 50, lines 50-52 reciting

that "[t]he template tooth can be scaled larger or smaller or positioned arbitrarily by the user, in order to get a[s] close a position as possible to the point cloud of the dentition." (emphasis added). Col. 51, lines 5-10 of Rubbert further states that "[t]he goal is to provide an algorithm that does not require a closely fitting template tooth object" (emphasis added). Thus, the rough approximation of Rubbert by overlaying a generic template would not appear capable of precisely identifying a gingival margin in a patient's dentition, nor would such a precise identification appear to be of concern for the conventional bracket/archwire (e.g., crown positioned) orthodontic systems of Rubbert. Rubbert certainly would not teach specifically defining a closed cutting surface passing through a line between the gingival and a crown of the tooth, and other elements as recited in claim 1.

Thus, for the reasons set forth above, no reasonable combination of the cited references would teach or suggest the claimed invention (e.g., claim 1), thereby precluding a *prima facie* case of obviousness under 35 U.S.C. §103(a). Claims 2-20, 27-28, and 30-31 will be allowable at least for depending on allowable claim 1, as well as on their own merits.

Independent claims 21-24, 26, and 37-39 recite elements that are similar to certain elements recited in claim 1. As such, the rejections of these claims are traversed for a similar rationale as set forth above with reference to claim 1 - no reasonable combination of the cited art would teach or suggest each element of the claimed invention. Claim 25 will be allowable at least for depending from allowable independent claim 24, as well as on its own merits. Accordingly, Applicants respectfully request that the rejections of claims 1-37 and 37-39 under 35 U.S.C. §103(a) be withdrawn, and that these claims be allowed.

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Application No. 10/633,015
Reply to Office Action of January 23, 2008

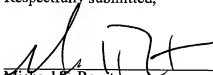
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CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 206-467-9600.

Respectfully submitted,

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